AUTOMOBILE ACCIDENTS IN THE YEAR FOLLOWING

HIGH SCHOOL : THE PREDICTIVE VALUE OF 377

UNOBTRUSIVE VARIABLES

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BY

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JOINT HIGHWAY RESEARCH PROJECT
PURDUE UNIVERSITY AND
INDIANA STATE HIGHWAY COMMISSION

Progress Report

AUTOMOBILE ACCIDENTS IN THE YEAR
FOLLOWING HIGH SCHOOL: THE PREDICTIVE
VALUE OF 377 UNOBTRUSIVE VARIABLES

TO: J. F. McLaughlin, Director
      Joint Highway Research Project

FROM: H. L. Michael, Associate Director
        Joint Highway Research Project

The attached Progress Report "Automobile Accidents in the Year Following High School: the Predictive Value of 377 Unobtrusive Variables" is submitted as the first report on the special research project approved by the JHRP Board on the relationship of formal education to highway safety. The research is being conducted by Professor William Asher, Departments of Education and Psychology, and Miss Beverly Dodson, Research Assistant.

Additional research is in progress on the Indiana students in the sample and will be reported at a later date.

The Report is presented to the Board for information and for the record.

Respectfully submitted,

Harold L. Michael
Associate Director

HLM/rg

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Progress Report

AUTOMOBILE ACCIDENTS IN THE YEAR FOLLOWING HIGH SCHOOL: THE PREDICTIVE VALUE OF 377 UNOBTRUSIVE VARIABLES

by

William Asher
Professor of Education and Psychology

and

Beverly Dodson
Research Assistant

AUTOMOBILE ACCIDENTS IN THE YEAR FOLLOWING HIGH SCHOOL:
THE PREDICTIVE VALUE OF 377 UNOBTRUSIVE VARIABLES

ABSTRACT

Automobile accidents in the post high school year were
studied for 377 social-psychological variables in a U. S.
sample of 7,500. Forty of these variables for the males
and 34 for the females were found to be predictive of ac-
cidents. These tended to be variables correlated with the
socio-economic-education dimension, high accent to cars, and
poor acclimatization in school. Driver training courses did
not reduce accidents. Higher socio-economic-education students
take driver training. Indiana's high school students are very
similar to the students in the rest of the United States

INTRODUCTION

Automobile accidents are a major problem of our society, and youngsters in their latter teens are at a particularly vulnerable age for these catastrophes. Thus analysis of data and development of theory about automobile accidents for this age group is especially desirable, particularly if it can be done with relatively inexpensive data.

Project TALENT (Flanagan, et al., 19??) collected information on some 500 variables on a sample of 425,000 high school students in the United States in 1960. Beginning in 1961 they collected additional information on each child one year before they were scheduled to graduate from high school and thereafter five years following their scheduled graduation. Recognizing that those concerned with reducing accidents in these age groups, TALENT's first follow up study asked a question about accidents during the past year. Unfortunately, TALENT had no funds to analyze this portion of the data and, even worse, unfortunately had to drop this question from further follow up studies. Death, suffering, and damage continue yearly when the expenditure for research of the cost of one major accident per year might well have gained enough insights to repay the research expenses hundreds or even thousands of times.

Meanwhile eight years of invaluable data have not been collected and seven years passed before the first writer, using funds from the U. S. Office of Education for training under-graduate educational researchers, was able to buy some data from

the bank for analysis. One wonders if society 1) is really interested in the problem of automobile accidents, and 2) is even somewhat rational.

Further statements, literature review, and theory about the importance now of the driver as the cause of most accidents, the ineffectiveness of driver education, the methodological problems of predicting accident criteria, are found in the report of the analysis of the first data bank (Schuster, 1970).

This paper reports the analysis of the remaining variables in the TALENT Data Bank particularly with respect to accidents, driver training, and the Indiana sample.

<center>PROBLEM</center>

The data used in this study were secured from Project TALENT (Flanagan, et al, 1964) a widely publicized research project supported by the Office of Education. Project TALENT offers data on about 400,000 high school students reasonably representative of a U. S. sample, who underwent a two-day period of paper and pencil testing in the spring of 1960. Some variables have been made available by the data bank (1965), including the results of numerous aptitude and achievement tests, an interest inventory, a student activities inventory, and a rather extensive student information blank.

The criterion variable, whether or not the subjects had had a significant accident in the past year, was obtained from a

METHOD

A Project TALENT (Flanagan, et al., 196?) sample of ... a ...
female subjects who were seniors in high school during 1960 was
selected. The criterion for grouping was whether # ? on the
twelfth-grade one-year follow-up study ... (...., 1965)
... each included ... by one response ... ... follow-up
... Item 5 ... follow-up ... ...
Multiple ... ... "Have you ... ... economic ... ...
involving bodily injury or ... ... damage since
June, 1960?" One hundred percent of the ... ... responded
"yes" to the above question ... ... formed the
"accident group." This ... in ... ... of ... sample
of those students who reported having an accident within the
past year. The N's for the non-accident and accident groups
were 4892 and 910 respectively, giving ... total N of 7809
subjects. In the accident group there were 3126 boys and 1454
girls. Thus the total sample of 7809 ... ... girls
and 4836 boys.

Three hundred seventy-seven (377) ... ... from the
Project TALENT data Bank (Flanagan, et al., 1965) were used
in addition to the criterion variable of having or not having
an accident in the past year. Such variables included the
results of information tests in literature, science, mechanics,
and home economics. Numerous aptitude and achievement test
results were included in the areas of language, creativity,

abst... reasoning, visualization in two and three dimen...,
mathemat...s, and ...ical checking. Items from the Student
Information ...ata furnished data on the students
back...and ...n... social and study hab...s, percent
financial ...studen...s health ...ans for matri...
and ...ate 9-...image. at ...1 1,... ...s...6 t...5.8...
all ...ff... on their numbers) ...and...n there are
... ...pos... hart...s ...t...ord ...(SIE) ...
...a...in...d mem... ...t...

...s...c...t...his...t...n...th... ... ...t...
bef... ...ne...t...i...s...ould... ... ...TALE T varia...es.
sever...t...ere...nt...roble...t...also to be ...id... Examination
of ...t...ms ...the Student Information ...ler (Flanagan,
et al, ...d... pps. ...d to 5-...) reve...y... her in some items,
respons... ...e not...ed in a ...ingle d...nsio...ality. For example,
quest... ...173... ...ited:

> ...lease ...te ...e best estimate you can of your family's
> ...tal in...he...for last year (19..). Include money
> ...n...by both parents and...he else in the house-
> ...h...he...re...

>   ...ss than ...
>   ...3000 to...999
> $6000 to $8,999
> D. $9000 to $11,999
> E. $12,000 or more
> F   I can't estimate this.

The responses A through F were coded 1 through 6. Obviously
response F was not a component of the continuum established in
responses A through E. Consequently, in order that correlation
analysis would be meaningful, response F was deleted. Also,

in all items it was necessary to delete codings that indicated
that the student made no response to the item.

The possible responses for item #29 from the SIB "Did
you take driver training in school?" were as follows:

    A   Yes
    B   No, this course is not available
    C   No, although the course is available
    D   No, but I expect to take the course later this year

The responses to this question were dichotomized. It was
felt that a comparison of response "A" and response "D" was of more
meaning. Consequently responses "B" and "C" were omitted.
(Since the subjects in our study were seniors in high school
only a negligible number responded "D.") Moreover the comparison
of response "B" with response "A" had been analyzed with respect
to accidents in a prior study (Asher & Dodson, 1970). Eighteen
TALENT items from the SIB could not be used in the correlational
analysis because responses to the items were not amenable to
rank order arrangement. An example is SIB #21, in which the
student is given a list of 36 alphabetically arranged occupations
and asked to mark the one he expects to take as career. This
was the major reason for the reduction of the sample of remaining
TALENT variables to the number analyzed (378). In order to
control for sex differences, data from boys and girls were run
separately.

ANALYSIS

As was indicated, the most convenient technique to reduce
this rather large quantity of data, a matrix of order 178 x 7996,
was via missing data product moment correlations using the BMD 03D
program (1964). With only minor losses of information the
unidimensional aspects of the coding were handled from
standard Pearsonian correlations, the multiple choice point
biserial correlations were computed by summing across categories,
selecting the assignment of the weights, and the coding was
non-missing data centered into the correlations computed.
All of these correlations of unary nature were first obtained
singly and collectively in a significant manner. Using the table
Guilford gives of Table 2 was used to assess the significance
of the correlations. The five percent level was used.

RESULTS

Of the 378 variables analyzed on some some 30 variables
of the males showed significant correlations with one criterion
criterion, ten of these at the one percent level. For the females
34 variables were related to accidents, eight at the one percent
level. Both of these sets of results are considerably greater
than chance expectations; however, the magnitude of the relation-
ships is not great. It is obvious that our hypothesization was
better than we might have anticipated when we selected the first
100 or so variables from the TALENT Data Bank for study. In

general those relationships are large [...] this study using the new variables (several other variables [...] correlation of greater than [...] for the boys [...] for the girls. Indeed, if the range had [...]

Table [...]

Again one variable [...] physical significant [...] accidents [...] these correlations [...] time were [...] to have one [...] of .092 and .271 respectively. These variables were employed in order to examine the possibility of significant variations when age group [...] auto accidents are prevalent, no differences were found.

In fact very few correlations were found with these variables. (See Table 2) Driver Training seems to be taken by those who learn to drive later than their peers especially for girls.

Table 1[a]

Significant Correlates With Accidents

(1 = non-accident group   2 = accident group)

Project TALENT Data Bank Variable Number	Variable	Correlation with Criterion Variable	
		Male	Female
Student Information Blank Number			
23	Mechanical or auto repair (1 = very often 5 = never)	-.115 n = 4270	-.079 n = 3416
31	Playing golf or tennis; swimming (1 = very often 5 = never)		-.083* n = 3442
46	Other (summer) work for pay (1 = very often 5 = never)	-.082* n = 4277	
47	Percent of spending money from regular allowance (1 = 0 percent 5 = 100 percent	-.067 n = 4285	
51	Age at first date (1 = 12 or younger 6 = never dated)	-.083 n = 4219	-.100* n = 3389
55	Evenings a week you go out for fun and recreation during the school year. (1 = less than one 6 = six or seven)	.075 n = 4203	.076 n = 3367
68	My grades reflect my ability fairly accurately. (1 = almost never 5 = almost always)	-.066 n = 4190	
69	I make sure that I understand what I am doing before I start an assignment (1 = almost never 5 = almost always)	-.062 n = 4209	-.062 n = 3373

Table 1 (contd)

Project TALENT Data Bank Variable Number	Variable	Correlation with Criterion Variable	
		Male	Female

Student Information Blank Number

71	Lack of interest in my school work makes it difficult for me to keep my attention on what I am doing. (1 = almost always 5 = almost never)	-.087* n = 4204	-.074 n = 3376
73	Failure to pay attention in class has caused my marks to be lower. (1 = almost always 5 = almost never)	-.069 n = 4206	
75	I do my assignments so quickly that I don't do my best work. (1 = almost always 5 = almost never)	-.073 n = 4194	-.063 n = 3380
76	I have missed assignments...because I was not paying attention (1 = almost always 5 = almost never)	-.095* n = 4204	
77	My teachers have criticized me for turning in a sloppy assignment. (1 = almost always 5 = almost never)	-.079 n = 4206	
78	Unless I really like a course, I do only enough to get by. (1 = almost always 5 = almost never)	-.087* n = 4203	
80	In class I can't seem to keep my mind on what the teacher is saying. (1 = almost always 5 = almost never)	-.072 n = 4220	
81	I get behind in my school assignments. (1 = almost always 5 = almost never)	-.079 n = 4219	-.065 n = 3388

Table 1 (contd)

Project TALENT Data Bank Variable Number	Variable	Correlation with Criterion Variable	
		Male	Female
Student Information Blank Number			
88	I keep up to date on my assignments by doing my work every day. (1 = almost never 6 = almost always)	-.075 n = 4151	-.070 n = 3348
96	How many days were you absent from school in the last school year? (1 = none 6 = twenty or more days)		.072 n = 3348
108	My grades in foreign language have been: (1 = all A's 6 = mostly D's or below)	.062 n = 2939	.062 n = 2431
109	My grades in history and social studies courses have been: (1 = all A's 6 = mostly D's or below)		.062 n = 3323
110	My grades in English courses have been: (1 = all A's 6 = mostly D's or below)	.066 n = 4115	
113	My grades in all courses starting with ninth grade have been: (1 = all A's 6 = mostly D's or below)	.072 n = 4091	
133	Father's responsibility for money and property on his job (1 = not in charge of money or property 4 = a great deal of money, merchandise or property)	.062 n = 3055	.075 n = 2228
142	Father's activity in a business or professional association (1 = extremely active 6 = not a member)	-.068 n = 3954	-.066 n = 3136

Table 1 (contd)

Project TALENT Data Bank Variable Number	Variable	Correlation with Criterion Variable	
		Male	Female
170	Building in which you live (1 = a one family house 5 = a rooming house, hotel, or trailer)		-.072 n = 3179
171	If your family is renting, how much is rent per month? (1 = less than $60 6 = have bought or are buying a home)	.073 n = 4051	
172	Value of present home (if bought or is buying): (1 = under $6,000 5 = more than $12,000)	.081* n = 3311	
173	Family's total income for last year (1959). (1 = less than $3,000 5 = $7,000 or more)	.074 n = 3262	.080 n = 1985
180	Number of mechanics, electronics, aviation or automobile magazines received regularly at home? (1 = none 6 = five or more)	.072 n = 4156	
190	Number of the following in home: automatic washer, automatic clothes dryer, electric dishwasher, electric or gas refrigerator, vacuum cleaner, home food freezer (1 = none 6 = five or six)	.077 n = 4190	.110* n = 3370
191	Number of the following in home: telephone, television set, radio phonograph (1 = none 5 = four)	.063 n = 4176	.068 n = 3362

Table 1 (contd)

Project TALENT Data Bank Variable Number	Variable	Correlation with Criterion Variable	
		Male	Female

Student Information
Blank Number

193	Number of the following in home: musical instruments, hi-fi or stereophonic set, classical records art equipment, photo developing equipment. (1 = none 6 = five)		.075 n = 3354
194	Number of the following in home: tennis racket, golf clubs, hunting equipment, skis, fishing equipement. (1= none 6 = five)	.095* n = 4182	.090* n = 3373
196	How many hand tools are in your home? (1 = five or less 6 = 26 or more)	.067 n = 4181	.069 n = 5532
197	How many electrically operated power tools are in your home? (1 = none 6 = five or more)	.065 n = 4179	.072 n = 3358
225	Number of rooms in home (1 = one 12 = seventeen or more)	.077 n = 4100	.089 n = 3346
230	How many athletic teams have you been a member of in the last 3 years? (1 = none 12 = eleven or more)		.069 n = 3351
241	How many different times have you been sick in bed in the past year? (1 = none 6 = nine or more)		.070 n = 3371
246	Average number hours of sleep per night (1 = about six or less 6 = about eleven or more)	-.069 n = 4078	

Table 1 (contd)

Project TALENT Data Bank Variable Number	Variable	Correlation with Criterion Variable	
		Male	Female
Student Information Blank Number			
247	How late up on weekends (1 = 9 P.M. or earlier 6 = 2 A.M. or later)	.093* n = 4064	.084* n = 3357
259	Normal use of both legs (1 = yes 2 = no)	-.073 n = 4076	
294	Average number of time a week driven car during past school year? (1 = none 6 = ten or more)	.140* n = 3923	.213* n = 3263
295	Do you have a car of your own? (1 = yes 2 = no)	-.079 n = 3945	-.114 n = 3283
313	Reasons for attending college: I enjoy learning. (1 = extremely important 6 = not a reason)	.075 n = 3723	
385	Percent of college expenses from loans from family, friends (1 = 0 percent 6 = 100 percent)		-.064 n = 1905
393	Where do you expect to live while attending college? (1 = at home with my family 2 = in a dormitory)		-.067 n = 1451
Follow-up #35	Access to a car	.266* n = 4420	.320* n = 3538

Table 1 (contd)

Project TALENT Data Bank Variable Number	Variable	Correlation with Criterion Variable	
		Male	Female
P * 801	Socio-economic-education index	.088	.101*
		n = 4254	n = 3422

Information Test:

R-112	Mechanics	.102*	
		n = 4360	
R-235	English: Effective expression		.071
			n = 3503
R-260	Creativity		.062
			n = 3475

[a]The variables can be operationally defined by referring to Flanagan, et
al (1965) The Project TALENT Data Bank for tests names and Flanagan, et
al (1964) pages 5-6 to 5-3? for the Student Information Blank (SIB) items.

*Variables significant at the .01 level or beyond.

Table 2

Significant Correlates With Driver Training

(1 = yes vs. 3 = No, but course is available)

Project TALENT Data Bank Variable Number	Variable	Correlation with Criterion Variables	
		Male	Female
12 grade Follow-up #30	Accidents (1 = non-accident group 2 = accident group) (not significant)	-.009 n = 3928	-.053 n = 3271
Student Information Blank			
10	Military or drill units (1 = extremely active 6 = not a member)	-.070 n = 3832	
38	How often delivered newspapers, mowed lawns, baby-sitted, done house cleaning, etc. for pay? (1 = very often 7 = never)		.063 n = 3213
94	Age at starting first grade (1 = 4 years 6 = nine years or older)	.077 n = 2993	
100	Semesters Social Studies (1 = none 6 = five or more)		-.065 n = 2499
136	Father's highest rank in military. (1 = enlisted 3 = officer)		.097 n = 520
163	Parents speak Hebrew or Yiddish (1 = very fluently 6 = doesn't speak)	.104* n = 2978	.113* n = 2489
170	Building in which you live (1 = one family house 5 = rooming house, hotel, or trailer)		-.092* n = 2384

Table 2 (contd)

Project TALENT Data Bank Variable Number	Variable	Correlation with Criterion Variables	
		Male	Female
Student Information Blank			
292	Age at first learning to drive (1 = 12 or younger 5 = 17 or older	-.074 n = 2862	-.101* n = 2127
385	Loans for college expenses from other sources (family, friends) (1 = 0 percent 5 = 100 percent	.067 n = 1700	
391	How far from home is the college you expect to attend? (1 = within commuting distance 4 = more than 51 miles)	.079 n = 1414	
393	Where do you expect to live while attending college? (1 = at home with my family 2 = in dormitory)	.056 n = 1250	
Information Test			
R-105	Social Studies	-.070 n = 2996	
R-139	Accounting, business, sales	-.088* n = 2956	

Again, the... ... ...

... ...

... ...

This Indiana sample of 120 oversamples, by about a factor of ten those who had automobile accidents. However, there are

non-significant correlations of -.016 for ... ...
between residence in Indiana and accidents. Therefore the
oversampling on this variable is of no importance for these
conclusions. (See Table 3)

Indiana students ... ...
students in the United States.

...

The ... ...
... ...
... ...
... ...
... ...
... ...
... ...
significant and ... ...
was collected prior ... ...
... ...
the accident.

This particular ... screened ... ...
and found results ... ... greater ... ...
although the magnitude ... the relationship was ... great. The
pattern still ... ...
social-economic-educational dimension as ... correlates ...

Table

Significant Correlates With Indiana And Non-Indiana

(Indiana = 1   N t Indiana = 2)

Project TALENT Data Bank Variable Number	Variable	Correlation with Criterion Variable	
		Male	Female

Student Information Blank Number

27	Playing baseball, football or basketball (1 = very often 5 = never)		-.081* n = 3432
98	Semesters Science Courses (1 = none 6 = 5 or more	.066 n = 4189	
99	Semesters foreign language (1 = none 6 = 5 or more)	.064 n = 4188	
102	Semesters business or commercial courses (1 = none 6 = 5 or more)		-.077 n = 3349
103	Voc. shop or Ag. courses (1 = none 6 = 5 or more)	-.091* n = 4169	
172	Value of home (1 = under $6,000 5 = more than $22,000)	.069 n = 3311	
201	Number brothers or sisters who are high school drop-outs (2 = none 6 = 4 or more)	-.070 n = 3671	
230	Number athletic teams (1 = none 12 = 11 or more		.091 n = 3351
232	What do you expect to do about military service? (2 = quit high school and enlist 11 = never serve for other reasons)		-.137 n = 85

Table 3 (contd.)

Significant Correlates with Indiana and Non-Indiana

(Indiana = 1   Not Indiana = 2)

Project TALENT Data Bank Variable Number	Variable	Correlation with Criterion Variable	
		Male	Female
393	Where do you expect to live while attending college? (1 = home 2 = dormitory)		-.083* n = 1451
Information Test			
R-103	Literature	.064 n = 4362	

accidents, except when the behavior of the driver is
such that it permits ...

(It must be recalled that ... driving ... have
just graduated from high ... and ... cars ... of
of their own.) An ... behavior ...

expected, increases the ...

... find by implies ...

in ... ...

at ... against ... ...

... and ... ...

... not being ... ...

... ...

for ... the ... class, ...

... assignments, skipping ... ... homework,

getting ... in assignments ... ...

... students

CONCLUSIONS

With the _____ of the significant _____ of _____ of
accidents, it ____ seem reasonable _____ to ____
human variations ____

One of _____ most _____ ____ _____ two
_____ ____ ____ ____ ____ ____ _____

____ ____ ____ ____ ____ ____ ____ ____ ____ ____

____ ____ _____ ____ ____ ____ ____ ____ ____ ____

_____ _____

____ ____ ____ _____ ____ _____ ____ ____

____ ____ ____ ____ _____ _____ ____

____ ____ _____ ____ ____ ____ _____ ____

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____ ____ ____ ____ ____ ____ ____ _____ ____ ____

____ ____ _____ _____ ____ _____ ____ ____

_____ ____ ____ _____ ____ ____ ____ ____ ____

____ ____ exposure.

8. Not being well acclimated in school is a predictor of accidents. Not paying attention, sloppy assignments and inattention in class are variables defining this lack of school acclimitization.

9. Driver training courses tend to be taken by those of higher socio-economic-educational status.

10. Indiana high school students are very similar to the rest of the high school students in the United States.

11. Indiana's high school students take driver training as frequently as students in the United States and have accidents with equal frequency.

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